

WHAT IS CLAIMED IS:

1. A linked data display method for displaying data items managed with given linkages thereamong, characterized in that:

5 first data, and second data linked to said first data are displayed mutually distinguishably by determining sizes thereof according to a distance of a linkage.

2. A linked data display method according to claim 10 1, wherein linked data items are displayed with a plurality of stepped sizes according to distances of linkages among a plurality of levels.

3. A linked data display method according to claim 1, wherein said linked data items are time-series data 15 items accumulated time-sequentially and displayed according to temporal distances.

4. A linked data display method according to claim 1, wherein said linked data items are hierarchical data items managed hierarchically and displayed according to 20 distances in a depth direction in a hierarchy.

5. A time-series data display method for displaying accumulated time-series data items time-sequentially, comprising steps of:

retrieving and displaying first data associated 25 with a desired date;
retrieving second data associated with a date

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contiguous to said desired date; and

displaying said second data distinguishably from said first data in a temporal direction starting with said desired date.

5 6. A time-series data display method according to claim 5, wherein said distinguishable display is such that a display screen for said second data is displayed with a smaller size than the one for said first data.

10 7. A time-series data display method according to claim 6, wherein said first data is displayed at an outermost position in a display screen, and said second data is displayed inside said first data with a display area thereof made smaller.

15 8. A time-series data display method according to claim 7, wherein third data associated with a date contiguous to the date of said second data is retrieved, and said third data is displayed inside said second data with a display area thereof made smaller.

20 9. A time-series data display method according to claim 5, wherein a display of each date is limited to a given number of data items, and wherein when the number of data items exceeds said given number, said data items are classified in units of a finer date and displayed distinguishably.

25 10. A time-series data display method according to claim 8, wherein when zoom-in is designated for a screen

display, the display positions of said first to third data items are shifted outward and the display areas thereof are made larger.

11. A time-series data display method according to
5 claim 10, wherein when said zoom-in is continued for a designated period of time, said first data is moved out of a display screen, and new data associated with a date contiguous to a date of data displayed at an innermost position is retrieved and displayed at said innermost
10 position.

12. A time-series data display method according to
claim 10, wherein when zoom-out is designated for a screen display, the display positions of said first to third data items are shifted inward and the display
15 areas thereof are made smaller.

13. A time-series data display method according to
claim 12, wherein when said zoom-out is continued for a designated period of time, data displayed at an innermost position is moved out of a display screen, and
20 new data associated with a date contiguous to a date of data displayed at an outermost position is retrieved and displayed at said outermost position.

14. A time-series data display method according to
claim 12, wherein said zoom-in or zoom-out is designated
25 in a screen, a speed of shifting display positions is varied depending on a designated position in said

15. A time-series data display method according to claim 5, wherein graphics such as rings or squares representing dates associated with displays are nested and displayed together with representations of data items.

17. A time-series data display method according to claim 15, wherein said graphics such as rings or squares representing dates associated with displays are displayed in different colors associated with said dates.

19. A time-series data display method according to claim 18, wherein said random positions are specified at the time of data registration.

20. A time-series data display method according to
25 claim 5, wherein said accumulated time-series data items
include data items accumulated in one-to-one

correspondence to dates of creation of data files, data items accumulated in one-to-one correspondence to dates of correction of files, and data items accumulated in one-to-one correspondence to designated dates registered
5 by a user.

21. A time-series data display method for displaying accumulated time-series data items time-sequentially, comprising steps of:

accumulating data items in one-to-one
10 correspondence to dates of a schedule table;
displaying said schedule table; and
displaying data items associated with a desired date of said schedule table responsively to designation of said desired date.

15 22. An information processing system for displaying accumulated time-series data items time-sequentially, comprising:

an accumulating means for accumulating data items in one-to-one correspondence to dates;

20 a retrieving means for retrieving data of a desired date and data of a date contiguous to said desired date responsively to designation of said desired date; and

a display means for displaying said retrieved data distinguishably in a temporal direction starting with
25 said desired date.

23. An information processing system according to

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claim 22, wherein said display means displays a display
screen for said data associated with a date contiguous
to said desired date with a smaller size than a display
screen for said data of said desired date according to
5 an elapsed time.

24. An information processing system according to
claim 23, wherein said display means displays said data
of said desired date at an outermost position in a
display screen, and displays said data of a date
10 contiguous to said desired date inside said data of said
desired date with a display area therefore made smaller
according to an elapsed time.

25. An information processing system according to
claim 22, wherein said display means includes a display
15 limiting means for limiting a display of each date to a
given number of date items, and a display dividing means
that when the number of data items exceeds said given
number, classifies said data items in units of a finer
date and displays said data items mutually
20 distinguishably.

26. An information processing system according to
claim 25, wherein said accumulating means includes a
subdividing and accumulating means for subdividing a
data accumulation unit into units of a finer date for
25 fear the number of data items should exceed said given
number, and then accumulating data items.

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27. An information processing system according to claim 24, further comprising a zoom designating means for use in designating zoom-in or zoom-out for a screen display, and a zoom control means that when zoom-in is
5 designated, shifts the display positions of data items outward so as to increase the display areas thereof, and that when zoom-out is designated, shifts the display positions of data items inward so as to decrease the display areas thereof.

10 28. An information processing system according to claim 27, wherein when zoom-in is designated, said zoom control means moves said data of said desired date out of a display screen, retrieves new data associated with a date contiguous to a date of data displayed at an
15 innermost position, and displays said new data at said innermost position, and wherein when zoom-out is designated, said zoom control means moves said data displayed at said innermost position out of a display screen, retrieves new data associated with a date
20 contiguous to a date of data displayed at an outermost position, and displays said new data at said outermost position.

29. An information processing system according to claim 27, wherein said zoom designating means includes a
25 designation input means for use in making a designation in a screen, and said zoom control means varies a speed

display positions depending on
id screen.

information processing system
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33. An information processing system according to claim 32, wherein said accumulating means determines said random positions at the time of data registration.

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5 by a user.

an accumulating means for accumulating data items
10 in one-to-one correspondence to dates of a schedule
table;

a second display means for displaying data items
15 associated with a desired date responsively to
designation of said desired date of said schedule table.

20 dividing a display area into an area, in which data
icons representing data items belonging to one level are
displayed, and an area in which child levels are
displayed; and

25 depending on a hierarchical depth. ← *P109 - INTRODUCTION - begin*
 37. A hierarchical data display method according *MIDDLE OF 2ND FULL P with "TYPICALLY"*
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to claim 36, wherein as said hierarchical depth *FIG 3*
increases, said data icon size is decreased.

38. A hierarchical data display method according
to claim 37, wherein as said hierarchical depth *FIG 3*
5 increases, said data icons are simplified more greatly.

Cont
39. A hierarchical data display method according
to claim 36, wherein said sizes of said division areas *FIG 3*
are determined on the basis of the number of data items
10 belonging to one level and the number of data items
belonging to child levels.

40. A hierarchical data display method according
to claim 36, wherein when there are a plurality of child
levels, a display area for each child level is *FIG 3*
determined according to the number of data items
15 belonging to levels subordinate to said child level.

41. A hierarchical data display method according
to claim 36, wherein said child levels are displayed in
a background expressing a parent level, and said
background is selected and displayed so that a *FIG 3*
20 hierarchical depth can be distinguished.

42. A hierarchical data display method according
to claim 39, wherein as said hierarchical depth
increases, said background is displayed in a deeper *?* *FIG 3*
color.

43. A hierarchical data display method according
to claim 36, further comprising a step of zooming in a

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Introductions

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displaying hierarchically-managed data items,
comprising:

a display area dividing means for dividing a
display area into an area, in which data icons
5 representing data items belonging to one level are
displayed, and an area in which child levels are
displayed; and

a data icon display means for displaying said data
icons with a size varied depending on a hierarchical
10 depth.

50. A hierarchical data browser system according
to claim 49, wherein said data icon display means
decreases said data icon size as said hierarchical depth
increases.

15 51. A hierarchical data browser system according
to claim 50, wherein said data icon display means
simplifies said data icons more greatly as said
hierarchical depth increases.

20 52. A hierarchical data browser system according
to claim 49, wherein said display area dividing means
determines sizes of division areas on the basis of the
number of data items belonging to one level and the
number of data items belonging to child levels.

25 53. A hierarchical data browser system according
to claim 49, wherein when there are a plurality of child
levels, said display area dividing means determines a

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display area for each child level on the basis of the number of data items belonging to levels subordinate to said child level.

54. A hierarchical data browser system according
5 to claim 49, wherein said data icon display means includes a background display means for displaying data items belonging to the same level in the same background, said child levels are displayed in a background expressing a parent level, and said
10 background is selected so that a hierarchical depth can be distinguished.

55. A hierarchical data browser system according to claim 54, wherein as said hierarchical depth increases, said background is displayed in a deeper
15 color.

56. A hierarchical data browser system according to claim 49, further comprising a zoom-in means for use in zooming in a desired level by performing a given operation after designating a display area for said
20 desired level.

57. A hierarchical data browser system according to claim 49, further comprising a detailed contents display means for use in displaying the detailed contents of a desired level by performing a given
25 operation after designating a display area for said desired level.

58. A hierarchical data browser system according to claim 56, further comprising a zoom-out means for use in zooming out a level zoomed in by performing a given operation so as to display a parent level.

5 59. A hierarchical data browser system according to claim 49, further comprising a grouping means for grouping a plurality of desired data icons, and displaying a leading data icon in such a way that it can be recognized that a plurality of data icons are grouped
10 together.

60. A hierarchical data browser system according to claim 59, further comprising a list display means for displaying a list of said plurality of data icons grouped together.

15 61. A hierarchical data browser system according to claim 59, further comprising a means for changing a representative picture of said plurality of data icons grouped together from one picture to another, a means for releasing a group, and a means for deleting a
20 desired data icon from a plurality of data icons grouped together.

62. A hierarchical data browser system, comprising:

25 a hierarchical data managing means for managing a plurality of data items hierarchically; and
a level display means that based on information

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representing a level and being retained in said hierarchical data managing means, defines an area, in which all data items belonging to one level and child levels are displayed, with a border encircling the whole of the area, displays said area as an area having a background painted in a given background color, represents said data items to be displayed in said display area using data icons serving as data identification information, and draws a display area for each of levels to be displayed in said display area; that is, a display area for each of child levels within said level display area using the same component elements.

FIG 3

63. A hierarchical data browser system according to claim 62, wherein said level display means includes an area defining means for calculating in advance a minimum area necessary for displaying data icons in one level display area, and defining a display area for child levels and a display area for data icons proportionally according to a ratio of the number of all data items belonging to child levels and levels subordinate to said child levels to the number of data items belonging to said level to such an extent that said display area for data icons will not become smaller than said minimum necessary area.

64. A hierarchical data browser system according

FIG 3

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to claim 63, wherein said level display means makes data icons smaller in size and simpler as said hierarchical depth increases.

65. A hierarchical data browser system according to claim 63, further comprising a zoom-in means for zooming in a level so as to move a view point to a deeper position in a hierarchy, a zoom-out means for zooming out a level so as to move a view point to a shallower position in said hierarchy, and a hierarchical depth indicating means for indicating a hierarchical depth of a zoomed-in level and a zoom direction.

66. A hierarchical data browser system according to claim 65, wherein when said zoom-in means is selected, said zoom direction is a direction toward a deeper position in a hierarchy, and when said zoom-out means is selected, said zoom direction is a direction toward a shallower position in said hierarchy.

67. A hierarchical data browser system according to claim 63, wherein said level display means includes an assessing means for assessing a size of an area allocated to one data icon relative to a threshold of a size of a level area which is provided as a reference for assessing a size of an area allocated to one data icon, and a setting means for setting at least one of the presence or absence of a data icon picture expressing a data icon, the presence or absence of a

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data name display, a font size for data name display,
and a size of an icon picture according to the result of
assessment.

68. A hierarchical data browser system according
5 to claim 67, wherein when an available memory is small,
said assessing means accordingly increases said
threshold of a size of an area allocated to one data
icon which is used to determine whether or not to
display an icon picture.

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10 69. A hierarchical data browser system according
to claim 63, further comprising a grouping means for
grouping a plurality of data icons for the sake of
management, and displaying them as a group icon.

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15 70. A hierarchical data browser system according
to claim 69, further comprising a list display means for
use in displaying a list of data icons belonging to a
group corresponding to a group icon by designating said
group icon, and a detailed information display means for
use in displaying detailed information of data
20 corresponding to a desired data icon selected from said
list by designating said data icon.

25 71. A hierarchical data browser system according
to claim 69, further comprising a means for changing a
representative picture of a plurality of data icons
grouped together from one picture to another, a means
for releasing a group, and a means for deleting a

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desired data icon from a plurality of data icons grouped together.

72. An image editing method for cutting out a designated area of an image in a given form, comprising
5 steps of:

preparing a plurality of cutout forms;

designating one of said cutout forms and placing it at a desired position in an image;

changing said cutout form into a desired size; and

10 outputting a portion of said image inside said cutout form as a cutout image.

73. An image editing method for cutting out a designated area of an image in a given form, comprising
steps of:

15 preparing a cutout form and image mutually independently with designating an identifier, position, and size of said cutout form as attributes of said image;

20 when a registered cutout form is placed at a desired position in an image, if said cutout form is enlarged or reduced to a desired size, registering said identifier of said cutout form, position, and size as attributes of said image; and

25 outputting a portion of said image inside said cutout form as a cutout image according to said registered image attributes.

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74. An image editing method according to claim 72 or 73, wherein said cutout form is placed on the center of the portion of an image to be cut out, and then enlarged or reduced with the center position thereof fixed.

75. An image editing method according to claim 74, wherein said cutout form is composed of a form used to cutting out an image and a form to be output as a perimeter of a cutout.

76. An image editing method according to claim 72 or 73, wherein said cutout image is used as a Sumner image in a data base system.

77. An image editing method for a hierarchical data management system for managing a plurality of data items hierarchically, comprising steps of:

registering an icon display size representing a size of an icon to be displayed and a data icon display position representing a display position for an icon as attributes of each data; and

determining said icon display size and data icon display position in hierarchical order, and displaying data icons serving as data identification information with a size made different in hierarchical order so that data icons belonging to the same level can be distinguished from data icons belonging to other levels.

78. An image editing method according to claim 77,

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wherein a level or data icon is zoomed in, panned, or zoomed out by varying said icon display size and data icon display position.

79. An image editing method according to claim 77,
5 wherein an access frequency meaning the number of accesses gained to data is included in said data attributes, and a data icon representing data whose access frequency is relatively large is displayed with a relatively large size.

10 80. An image editing method for a hierarchical data management system for managing a plurality of data items hierarchically, comprising steps of:

displaying data icons serving as data identification information with a size made different in
15 hierarchical order;

accessing data corresponding to a desired data icon by designating said desired data icon; and

displaying a data icon representing data whose
access frequency is relatively larger with a relatively
20 larger size.

81. An image editing method according to claim 79 or 80, wherein data icons belonging to the same level are displayed distinguishably from data icons belonging to other levels, and a level containing data whose
25 access frequency is relatively high is displayed with a relatively large size.

82. An image editing method according to claim 79 or 80, wherein when said data icon displayed with a relatively large size is not accessed for a period of time exceeding a certain period, said data icon is
5 reduced in proportion to said period during which said data icon is not accessed or an access frequency of another data.

83. An image editing method according to claim 80,
10 further comprising a step of zooming in, panning, or zooming out a desired level or data icon by designating said level or data icon.

84. An image editing method according to claim 83,
wherein a data icon belonging to a level subordinating a marked level is vignettted and displayed.

85. An image editing method according to claim 84,
15 wherein said vignetting is achieved by enlarging raw data representing the number of pixels smaller than the number of pixels to be displayed.

86. An image editing method according to claim 85,
20 wherein a data icon belonging to a higher level is vignettted more intensely.

87. An image editing method according to claim 77,
wherein date information selected from among date
information representing a date of creation of data,
25 date information representing a date of access gained to data, date information specified in data is included in

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88. An image editing method according to claim 87,
wherein data icons associated with the same date are
zoomed in or zoomed out by varying said icon display
size and data icon display position.

89. An image editing method according to claim 87, wherein either said hierarchical display or date-orderly display can be selected.

15 90. An image editing method according to claim 77,
further comprising a step of displaying a position in a
whole hierarchy, which is currently displayed in a
screen, within a separate window in the form of a
position on a plane defined with vertical and lateral
20 lines and a position in a depth direction, and a step of
displaying a desired level at a desired enlargement
ratio by designating a desired position within said
separate window.

91. An image editing system for cutting out a
25 designated area of an image in given form, comprising:
a registering means for registering a plurality of

a situating means for use in designating one of said registered cutout forms and placing it at a desired position in an image;

a cutout means for outputting the portion of said image inside said cutout form as a cutout image.

a registering means for registering a cutout form
and image mutually independently;

a situating means for use in situating a registered cutout form in an image by performing a given operation;

15 a changing means for use in enlarging or reducing
said cutout form to a desired size by performing a given
operation;

an attribute registering means for registering an identifier, position, and size of said cutout form as
20 attributes of said image; and

an image output means for outputting the portion of said image inside said cutout form as a cutout image according to said registered image attributes.

93. An image editing system according to claim 91
25 or 92, wherein said situating means aligns the center of
said cutout form with the center of the portion of an

cut out, and said changing means for changing said cutout form with the center of said image editing system according to said registering means representing a form used to cut out a picture from an input as a perimeter of a cutout image editing system according to said image editing system, and said cutout image editing system for a picture editing system for managing a picture hierarchically, comprising:

1. a registering means for registering a size representing a size of a picture and a data icon display position for an icon as attribute information;

2. a display means for determining a display order and data icon display position for each picture in hierarchical order so that pictures at the same level can be distinguished from pictures belonging to other levels.

3. an image editing system according to said display means.

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items hierarchically, comprising:

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97. An image editing system according to claim 96,

5 98. An image editing system according to claim 96,
further comprising a second display changing means for
registering an access frequency meaning the number of
accesses gained to data as an attribute of data, and
displaying a data icon representing data whose access
10 frequency is relatively high with a relatively large
size.

15 a display means for displaying data icons serving
as data identification information with a size varied in
hierarchical order;

a second display changing means for displaying a data icon representing data whose access frequency is relatively high with a relatively large size.

100. An image editing system according to claim 98
25 or 99, wherein said display means displays data icons
belonging to the same level distinguishably from data

icons belonging to other levels, and said second display changing means displays a level containing data whose access frequency is relatively high with a relatively large size.

5 101. An image editing system according to claim 98 or 99, wherein when said data icon displayed with a relatively large size is not accessed for a period of time exceeding a certain period, said second display changing means reduces said data icon in proportion to
10 said period during which said data icon is not accessed or an access frequency of another data.

 102. An image editing system according to claim 99, further comprising a first display changing means for use in zooming in, panning, or zooming out a desired
15 level or data icon by designating said level or data icon.

 103. An image editing system according to claim 102, wherein said first display changing means includes a vignetting means for vignetting and displaying data
20 icons belonging to a level subordinating a marked level.

 104. An image editing system according to claim 102, wherein said vignetting means achieves vignetting by enlarging raw data representing the number of pixels smaller than the number of pixels to be displayed.

25 105. An image editing system according to claim 104, wherein said vignetting means vignettes data icons

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belonging to a higher level more intensely and displays them.

106. An image editing system according to claim 96, wherein said attribute registering means registers
5 date information selected from among date information representing a date of creation of data, date information representing a date of access gained to data, and date information specified in data, further comprising a second display means for determining said
10 icon display size and data icon display position date-orderly, and thus displaying data icons serving as data identification information with a size made different date-orderly so that data icons associated with the same date can be distinguished from data icons associated
15 with other dates.

107. An image editing system according to claim 106, further comprising a third display changing means for zooming in or out data icons associated with the same date by varying said icon display size and data
20 icon display position.

108. An image editing system according to claim 106, further comprising a switching means for selecting either said first display means or second display means.

109. An image editing system according to claim 96, wherein said first and second display means display
25 a position in a whole hierarchy, which is currently

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displayed in a screen, within a separate window in the
form of a position on a plane defined with vertical and
lateral lines and a position in a depth direction,
further comprising a display designating means for use
5 in displaying a desired level at a desired enlargement
ratio by designating a desired position in said window.

110. A computer program product comprising a
computer usable medium having computer readable program
code means for displaying data items managed with given
10 linkages thereamong, said computer program product
including:

computer readable program code means for displaying
first data, and second data linked to said first data,
mutually distinguishably by determining sizes thereof
15 according to a distance of a linkage.

111. A computer program product according to claim
110, wherein the computer usable medium further having
data linked to be used by said computer readable program
code means.

112. A computer program product comprising a
20 computer usable medium having computer readable program
code means for displaying accumulated time-series data
items time-sequentially, said computer program product
including:

25 computer readable program code means for retrieving
first data associated with a desired date and second

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data associated a date contiguous to said desired date;
and

computer readable program code means for displaying
said first data, and said second data distinguishably
5 from said first data in a temporal direction starting
with said desired date.

113. A computer program product according to claim
112, further including computer readable program code
means for zooming in said first and second data by
10 shifting data in a direction of said second data to said
first data and making display area larger, and for
zooming out said first and second data by shifting data
in a direction of said first data to said second data
and making the display area smaller.

114. A computer program product according to claim
15 112, wherein the computer usable medium further having
time-series data to be used by said computer readable
program code means.

115. A computer program product comprising a
20 computer usable medium having computer readable program
code means for displaying accumulated time-series data
items time-sequentially, said computer program product
including:

computer readable program code means for
25 accumulating data times in one-to-one correspondence to
dates of a schedule table; and

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computer readable program code means for displaying said schedule table, and data items associated with a desired date of said schedule table responsively to designation of said desired date.

5 116. A computer program product according to claim 115, wherein said computer usable medium further having said schedule table.

10 117. A computer program product comprising a computer usable medium having computer readable program code means for displaying hierarchically-managed data items, said computer program product including:

15 computer readable program code means for dividing a display area into an area, in which data icons representing data items belonging to one level are displayed, and an area in which child levels are displayed; and

 computer readable program code means for displaying said data icons with a size varied depending on a hierarchical depth.

20 118. A computer program product according to claim 117, wherein said computer usable medium further having a hierarchically-managed data.

25 119. A computer program product comprising a computer usable medium having computer readable program code means for cutting out a designated area of an image in a given form, said computer program product

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including:

computer readable program code means for designating one of registered cutout forms and placing it at a desired position in an image;

5 computer readable program code means for changing said cutout form into a desired size; and

computer readable program code means for outputting a portion of said image inside said cutout form as a cutout image.

10 120. A computer program product according to claim 119, wherein said computer usable medium further having a plurality of cutout forms and images to be cut out.

121. A computer program product comprising a computer usable medium having computer readable program
15 code means for cutting out a designated area of an image in a given form, said computer program product including:

computer readable program code means for registering an identifier of a cutout form, and size as
20 attributes of an image, if said cutout form is enlarged or reduced to a desired size, when a registered cutout form is placed at a desired position in said image; and

computer readable program code means for outputting a portion of said image inside said cutout form as a
25 cutout image according to said registered image attributes.

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122. A computer program product according to claim
121, wherein said computer usable medium further having
cutout forms and images mutually independently, with
designating an identifier, position, and size of said
5 cutout form as attributes of said image.

123. A computer program product comprising a
computer usable medium having computer readable program
code means for managing a plurality of data items
hierarchically, said computer program product including:

10 computer readable program code means for displaying
data icons serving as data identification information
with a size made different in hierarchical order;

computer readable program code means for accessing
data corresponding to a desired data icon by designating
15 said desired data icon; and

computer readable program code means for displaying
a data icon representing data whose access frequency is
relatively larger with a relatively larger size.

124. A computer program product according to claim
20 123, wherein said computer usable medium further having
a hierarchical data and an access frequency data.

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FIG. 10

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A4

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